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FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH
ZINC CHROMATES.(U)

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UNCLASSIFIED FTD-ID(RS)T-1041-79

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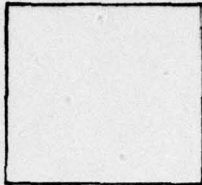


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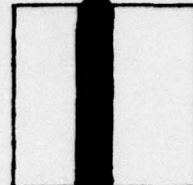
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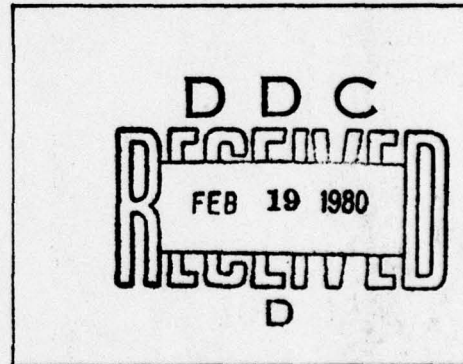
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ZINC CHROMATES



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EDITED TRANSLATION

FTD-ID(RS)T-1041-79

20 July 1979

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ZINC CHROMATES

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PREPARED BY:

TRANSLATION DIVISION
FOREIGN TECHNOLOGY DIVISION
WP.AFB, OHIO.

U. S. BOARD ON GEOGRAPHIC NAMES transliteration SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<i>А а</i>	A, a	Р р	<i>Р р</i>	R, r
Б б	<i>Б б</i>	B, b	С с	<i>С с</i>	S, s
В в	<i>В в</i>	V, v	Т т	<i>Т т</i>	T, t
Г г	<i>Г г</i>	G, g	У у	<i>У у</i>	U, u
Д д	<i>Д д</i>	D, d	Ф ф	<i>Ф ф</i>	F, f
Е е	<i>Е е</i>	Ye, ye; E, e*	Х х	<i>Х х</i>	Kh, kh
Ж ж	<i>Ж ж</i>	Zh, zh	Ц ц	<i>Ц ц</i>	Ts, ts
З з	<i>З з</i>	Z, z	Ч ч	<i>Ч ч</i>	Ch, ch
И и	<i>И и</i>	I, i	Ш ш	<i>Ш ш</i>	Sh, sh
Й й	<i>Й й</i>	Y, y	Щ щ	<i>Щ щ</i>	Shch, shch
К к	<i>К к</i>	K, k	Ъ ъ	<i>Ъ ъ</i>	"
Л л	<i>Л л</i>	L, l	Ы ы	<i>Ы ы</i>	Y, y
М м	<i>М м</i>	M, m	Ь ь	<i>Ь ь</i>	'
Н н	<i>Н н</i>	N, n	Э э	<i>Э э</i>	E, e
О о	<i>О о</i>	O, o	Ю ю	<i>Ю ю</i>	Yu, yu
П п	<i>П п</i>	P, p	Я я	<i>Я я</i>	Ya, ya

*ye initially, after vowels, and after ъ, ы; e elsewhere.
When written as ё in Russian, transliterate as yë or ë.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh ⁻¹
cos	cos	ch	cosh	arc ch	cosh ⁻¹
tg	tan	th	tanh	arc th	tanh ⁻¹
ctg	cot	cth	coth	arc cth	coth ⁻¹
sec	sec	sch	sech	arc sch	sech ⁻¹
cosec	csc	csch	csch	arc csch	csch ⁻¹

Russian	English
rot	curl
lg	log

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GOST
16763--71

ZINC CHROMATES

In lieu of
OST 10937--40

By decree of the State Committee of Standards of the USSR Council of Ministers of 4/III 1971 No 378 the period of introduction has been established

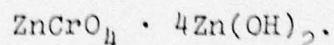
since 1/I 1972
in connection with zinc chromate and potassium brand A since 1/I 1975;
in connection with zinc chromate and potassium brand B for the period

to 1/I 1975

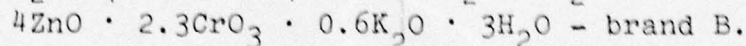
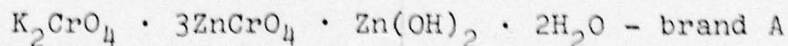
Nonobservance of the standard is subject to persecution by law.

The present standard extends to zinc chromates - synthetic inorganic pigments of a light yellow color with a different content of zinc oxide, potassium oxide, and chromium oxide.

Approximate formula for zinc tetrahydroxide-chromate:



Approximate formulas for zinc chromate and potassium:



The chromates are produced in the form of a powder which does not contain mechanical impurities and in lumps which are not crushed with a spatula.

The standard incorporates the requirements of the SEV recommendation on standardization RS 2088--69.

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1. Brands and technical requirements

1.1. Depending on application the following zinc chromates are produced:

zinc tetrahydroxide-chromate - brands A and B - for the production of primers; brand A is not used for parkerizing primers;

zinc chromate and potassium - brand A - for the production of anticorrosive, decorative and artist paints and enamels; brand B - for the production of artist paints.

1.2. In physical and chemical indices the zinc chromates should conform to the requirements and standards indicated in Table 1.

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Table 1

Name of index (1)	(2) Standards for brands of				Method of testing (3)
	zinc tetrahydroxide-chromate		zinc chromate and potassium		
	A	B	A	B	
1. Color	Not standardized		Based on approved samples within tolerance limits		p.3.1
2. Dyeing power for approved sample, %, no less than	Not standardized		90		p.3.2
3. Content of zinc converted to ZnO, %	66-72		35-40	42-52	p.3.3
4. Content of chromium converted to CrO ₃ %, no less than	16		42	32	p.3.4
5. Content of alkali metal converted to K ₂ O, %, no more than	Not standardized		12	Not standardized	p.3.5
6. Content of water-soluble chromates converted to CrO ₃ %, not more than	0.5	2	1.0		p.3.6
7. Content of lead compounds converted to PbO, %, not more than	0.03		0.03	0.1	p.3.7
8. Content of sulphates converted to SO ₃ %, not more than	0.1		0.1	5.0	p.3.8
9. Content of chlorides converted to Cl, %, not more than	0.1		0.1	Not standardized	p.3.9
10. Content of substances insoluble in ammonia solution of ammonium chloride, %, no more than	0.5		0.5		p.3.10

(1) FIRST LINE OF TEXT	(2)				(3)
	A	B	A	B	
11. Moisture content, %, no more than	2	4	1	2	p.3.11
12. Oil absorption, g/100 g of pigment	45-70	35-50	20-35		p.3.12
13. Covering power, g/m ² , no more than	Not standardized		120	Not standardized	p.3.13
14. Residue after wet sifting, %, no more than: on sieve with strainer No 0063K No 0045K	0.5 Not standardized		Not standardized 0.5		p.3.14
15. Stability of parkerized primers of brands VL-02 and VL-023	Not standardized	In two hours after preparation viscosity of primer should not increase by more than 20%	Not standardized		p.3.15

Note: Samples of color and dyeing power of zinc chromate and potassium are maintained by the Ministry of the Chemical Industry.

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2. Rules for acceptance

2.1. Zinc chromate should be supplied in consignments. A consignment is a quantity of zinc chromate which is uniform in its qualitative indices, is sent to one address, and is accompanied by one quality document.

2.2. In the control check of an incoming consignment of zinc chromate the sample is selected in accordance with the requirements of GOST 9980--62.

2.3. The selection of samples, analysis and application of zinc chromates are performed with observation of hygiene rules and rules for accident prevention which have been adopted for operation with chemical substances. When working with pigment it is necessary to use the means of individual protection (respirators, rubber gloves, coveralls).

There should be exhaust ventilation at the work sites.

2.4. When unsatisfactory results are obtained from an analysis of even one of the indices make a repeated analysis of a double number of samples taken from the same consignment. The results of the repeated analysis are final.

3. Test methods

3.1. Determination of color.

3.1.1. Reagents, solutions and materials used:

distilled water per GOST 6709--53;

glycerin per GOST 6259--71;

metallic spatula with blade width of 80-100 mm;

60x80 mm drafting paper per GOST 597--56;

approved color samples;

photographic gelatin per GOST 317--63, 1% solution, prepared in the following manner: to 100 ml of a 1% solution of gelatin add 1.6 mm of glycerin and mix thoroughly. The resulting solution is suitable for use for two days.

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3.1.2. Preparation for testing.

Two grams of the test or approved sample of pigment, weighed with an accuracy to 0.01 g, are placed on a marble slab, 3.5 ml of a gelatin solution are added and the mixture pulverized rapidly with a grinder for no more than 3 min. The resulting paste is picked up and with the help of a spatula applied on drafting paper until a uniform surface is obtained and dried at a temperature of 18-23°C.

3.1.3. Conducting of the test.

Pigment films of the test and approved samples of pigment (light and dark tolerances), prepared according to p. 3.1.2., are compared in diffuse daylight.

The pigment film of the test pigment should conform in color to the pigment of one of the two test samples of pigment color or be found between them.

3.2. Determination of dyeing power.

3.2.1. Reagents, solutions and instruments used:

zinc white dry per GOST 202--62, M-1;

approved sample (dark tolerance);

linseed oil per GOST 5791--66;

pulverizer mechanical disk type MAPP-1 or marble slab with grinder - diameter of base 60-80 mm;

plate with dimensions 90x40x2 mm made out of glass per GOST 111--65;

metallic spatula with blade width of 80-100 mm.

3.2.2. Preparation for testing.

Two grams of zinc white and 0.2 g of the test or approved sample of pigment, weighed with an accuracy to 0.0002 g, are placed on the lower disk of the mechanical pulverizer, 0.9 ml of linseed oil is added and then it is mixed with a spatula. Close the upper disk of the pulverizer and with full load connect into a network. After each 25 revolutions the instrument is turned off and with the spatula the paste is collected from both disks onto the middle of the lower disk and the rubbing operation repeated. Total number of revolutions - 100.

If no mechanical pulverizer is available the paste is prepared

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on a marble slab with a grinder. After each 25 movements (one movement is considered the movement of the grinder to both sides) the paste is collected with the spatula onto the middle of the slab and ground again. Total number of movements - 100. Prepared pastes are stored for no more than 24 hours.

3.2.3. Conducting of the test.

Pastes of the test and approved samples of pigments, prepared according to p. 3.2.2., are applied along side each other on the glass plate with the help of the spatula and their color is compared, being observed from the reverse side in diffuse daylight. If the paste of the test sample is lighter or darker than the paste of the approved sample, then the amount of test pigment is changed in such a manner that the color of its paste would coincide with the color of the paste of the test sample. The amount of zinc white and oil in all cases remains constant.

3.2.4. Processing of results.

The dyeing power of the test pigment (X_1) against the approved sample in percentages is calculated using the formula:

$$X_1 = \frac{G \cdot 100}{G_1},$$

where:

G - weighed portion of approved sample in mixture, g;

G_1 - weighed portion of test pigment, taken for obtaining the paste, the same in color with the paste of the approved sample, g.

Permissible deviations between two parallel determinations - 2.5%.

3.3. Determination of the content of zinc recalculated for ZnO.

3.3.1. Reagents and solutions used:

Trilon B (complexone III, disodium salt of ethylenediamine-tetraacetic acid) per GOST 10652--63 0.1 N solution; prepared according to GOST 10398--63;

buffer ammonium mixture, pH 9.5-10; prepared according to GOST 4517--65, P21;

acetic acid per GOST 61--69, analytically pure, 30% solution;
liquid ammonia per GOST 3760--64, 25% solution;
mixture of indicator Eriochrome Black T; prepared according
to GOST 10398--63;

distilled water per GOST 6709--53.

3.3.2. Conducting of the test.

One gram of zinc chromate, preliminarily dried to a constant mass at 105°C, is weighed with an accuracy to 0.0002 g and placed in a beaker with a capacity of 200 ml. A 50 ml solution of acetic acid is added and it is dissolved with heating. To the resulting solution of pigment 100 ml of water are added and it is transferred into a volumetric flask with a capacity of 250 ml. After cooling the contents of the solution are brought up to the mark with water and shaken thoroughly (solution 1). 25 ml of the solution are transferred by pipet to an Erlenmeyer flask with a capacity of 250 ml, 100 ml of water are added and it is neutralized with a solution of ammonia, adding it by drops until the color of the solution changes from lemon-yellow to yellow-green. After neutralization 5 ml of buffer mixture and approximately 0.05 g of dry indicator mixture are added, it is mixed and titrated with Trilon B up until change-over from cherry-red to emerald-green.

3.3.3. Processing of results.

The content of zinc in a recalculation for ZnO (X_2) in percentages is calculated using the formula:

$$X_2 = \frac{V \cdot 0.004069 \cdot 10 \cdot 100}{G},$$

where:

V - volume precisely of 0.1 N solution of Trilon B, spent for titration, ml;

G - weighed portion of pigment, g;

0.004069 - amount of ZnO, corresponding to 1 ml precisely of an 0.1 N solution of Trilon B, g.

Permissible deviations between two parallel determinations - 0.5 %.

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3.4. Determination of the content of chromium recalculated for CrO_3 .

3.4.1. Solutions and reagents used:

sulfuric acid per GOST 4204--66, chemically pure, solution 1:4;

potassium iodide per GOST 4232--65, chemically pure, 15% solution;

sodium thiosulfate per GOST 4215--66, chemically pure, 0.1 N solution;

sodium bicarbonate per GOST 4201-66, crystalline;

soluble starch per GOST 10163--62, 1% freshly prepared solution;

distilled water per GOST 6709--53.

3.4.2. Conducting of the test.

50 ml of solution, prepared according to p. 3.3.2, are transferred by pipet into a 500 ml Erlenmeyer flask with a ground-glass stopper, and 50-70 ml of water, 20 ml of a solution of sulfuric acid, and around 2 g of sodium bicarbonate are added. After the flask is filled with carbon dioxide a 20 ml solution of potassium iodide is added. The flask is closed with a stopper which is wetted with a solution of potassium iodide and set for 5-10 min in a dark place. Then the stopper is rinsed off with water into the same flask and it is titrated with a solution of sodium thiosulfate. Prior to the end of titration 3 ml of starch are added and the titration continued up to the change-over of the color of the solution from blue to green or blue-green.

3.4.3. Processing of results.

The content of chromium recalculated for CrO_3 (X_3) in percentages is calculated using the formula:

$$X_3 = \frac{V \cdot 0.003333 \cdot 5 \cdot 100}{G},$$

where:

V - volume precisely of 0.1 N solution of sodium thiosulfate, spent for titration, ml;

G - weighed portion of pigment, g (according to p. 3.3.2);

0.003333 - amount of CrO_3 , corresponding to 1 ml precisely of a 0.1 N solution of sodium thiosulfate, g.

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Permissible deviations between two parallel determinations - 0.4%.

3.5. Determination of the content of alkali metal recalculated for K_2O .

3.5.1. Reagents and solutions used:

hydrochloric acid per GOST 3118--67, chemically pure, solution 1:3;

sodium thiosulfate per GOST 4215--66, 0.1 N solution;

potassium iodide per GOST 4232--65, chemically pure, 15% solution;

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sodium bicarbonate per GOST 4201--66, crystalline;

soluble starch per GOST 10163--62, 1% freshly prepared solution;

distilled water per GOST 6709--53.

3.5.2. Conducting of the test.

1-2.5 g of pigment, preliminarily dried to a constant mass at $105^{\circ}C$, are weighed with an accuracy to 0.0002 g in a porcelain crucible and calcined for one hour at $600^{\circ}C$. After calcination the residue is leached out with hot water, in this case the chromates of alkali metals pass into the solution, which together with the insoluble portion is transferred quantitatively onto a thick paper filter with the help of small amounts of hot water. The filter is flushed with hot water until the complete discoloration, collecting all the flushing water in an Erlenmeyer flask with a ground-glass stopper.

The filtrate is diluted with water to 150 ml, acidified with 30 ml of a solution of hydrochloric acid, and 2 g of sodium bicarbonate are added. After the flask is filled with carbon dioxide 10-12 ml of a solution of potassium iodide is added, it is stirred slightly, the flask is covered with a stopper, wetted with a solution of potassium iodide and placed in a dark place for 5-10 min. After this the solution is titrated with a solution of sodium thiosulfate. Before the end of titration 3 ml of a starch solution are added and titration continued up to the change-over of the color of the solution from blue to light-green.

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3.5.3. Processing of results.

The content of potassium recalculated for K_2O in percentages is calculated using the formula:

$$X_4 = \frac{V \cdot 0.00313 \cdot 100}{G}$$

where:

V - volume precisely of 0.1 N solution of sodium thiosulfate, spent for titration, ml;

G - weighed portion of pigment, g;

0.00313 - amount of K_2O , corresponding to 1 ml precisely of an 0.1 N solution of sodium thiosulfate, g.

Permissible deviations between two parallel determinations - 0.06%.

3.6. Determination of the content of water-soluble chromates recalculated for CrO_3 .

3.6.1. Reagents and solutions used:

sulfuric acid per GOST 4204--66, chemically pure, 1:4;

potassium iodide per GOST 4232--65, chemically pure, 15% solution;

sodium thiosulfate per GOST 4215--66, 0.1 N solution;

sodium bicarbonate per GOST 4201--66, crystalline;

soluble starch per GOST 10163--62, 1% freshly prepared solution;

distilled water per GOST 6709--53.

3.6.2. Conducting of the test.

25 g of pigment, weighed with an accuracy to 0.01 g, are placed in a 250 ml volumetric flask. Water is added to the mark and it is stirred for 30 min. After this the suspension is let stand for around 10 min and carefully, without agitating the residue, decanted through a dry and thick filter "blue tape" into a dry flask, discarding the first 15-20 ml of the filtrate. From the resulting filtrate a pipet is used to remove 50 ml and transfer it to a 250 ml Erlenmeyer flask with a ground-glass stopper; then to it 50-70 ml of water are added and further determination made according to p. 3.4.2.

3.6.3. Processing of results.

The content of water-soluble chromates recalculated for CrO_3 (X_5) in percentages is calculated using the formula:

$$X_5 = \frac{V \cdot 0.003333 \cdot 5 \cdot 100}{G}$$

where:

V - volume precisely of 0.1 N solution of sodium thiosulfate, spent for titration, ml;

G - weighed portion of pigment, g;

0.003333 - amount of CrO_3 , corresponding to 1 ml precisely of an 0.1 solution of sodium thiosulfate, g.

Permissible deviations between two parallel determinations - 0.01%.

3.7. Determination of the content of lead compounds recalculated for PbO .

3.7.1. Reagents and solutions used:

acetic acid per GOST 61--69, 30% solution;

hydrochloric acid per GOST 3118-67, solution 1:4;

sodium bicarbonate per GOST 4201--66, crystalline;

sodium thiosulfate per GOST 4215-66, 0.1 N solution;

potassium iodide per GOST 4232--65, chemically pure, crystalline and 10% solution;

soluble starch per GOST 10163--62, 1% freshly prepared solution;

distilled water per GOST 6709--53.

3.7.2. Conducting of the test.

Around 5 g of zinc chromate, preliminarily dried to a constant mass at 105°C , are weighed with an accuracy to 0.0002 g and placed in a 250 ml beaker. 50 ml of a solution of acetic acid are added and it is boiled for 5-10 min, in this case the large particles are crushed slightly with a glass rod. 50-50 ml of hot water are added and the nondissolved part of the pigment together with the solution are transferred quantitatively (with hot water) onto a thick paper filter "blue tape." The filter is flushed with hot

water up until a negative reaction to the $[\text{CrO}_4]^{2-}$ ion (sample with silver nitrate) and the filtrate is discarded. The residue on the filter is processed with 50-75 ml of a solution of hydrochloric acid up to the complete dissolving of the PbCrO_4 , and then the filter is flushed five times with hot water.

The filtrate and flushing water obtained are collected in a 250 ml Erlenmeyer flask with a ground-glass stopper, they are cooled, 2 g of sodium bicarbonate and 1.5 g of potassium iodide are added, it is covered with the stopper, wetted with a solution of potassium iodide and placed in a dark place. After 10 min the stopper is washed off with water into the flask and it is titrated with sodium thiosulfate (by drops) in the presence of starch up until the decolorization of the solution.

3.7.3. Processing of results.

The content of lead compounds recalculated for PbO (X_6) in percentages is calculated using the formula:

$$X_6 = \frac{V \cdot 0.00744 \cdot 100}{G}$$

where:

V - volume precisely of 0.1 N solution of sodium thiosulfate, spent for titration;

G - weighed portion of zinc chromate, g;

0.00744 - amount of PbO , corresponding to 1 ml precisely of an 0.1 N solution of sodium thiosulfate, g.

Permissible deviations between two parallel determinations - 0.01%.

3.8. Determination of content of sulphates recalculated for SO_3 .

3.8.1. Reagents and solutions used:

hydrochloric acid per GOST 3118-67, 20% solution;

acetic acid per GOST 61--69, chemically pure glacial;

barium chloride per GOST 4108--65, 10% solution;

ethyl alcohol industrial per GOST 8314--57;

distilled water per GOST 6709--53.

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3.8.2. Conducting of the test.

5 g of pigment, preliminarily dried to a constant mass at 105°C (for zinc tetrahydroxide-chromate of brands A and B and zinc chromate and potassium of brand B), or 1 g of pigment (for zinc chromate and potassium of brand B), weighed with an accuracy to 0.0002 g, are placed in a 400 ml beaker. 50 ml of a solution of hydrochloric acid and 10 ml of ethyl alcohol are added, it is heated to total dissolving of the pigment, if necessary it is filtered. In this case the chromates are reduced, which is noticeable based on the change of color of the solution to a green color. The resulting solution is diluted with water to 200 ml and 4-5 ml of ethyl alcohol and 20 ml of acetic acid are added for preventing the formation of an internal complex of chromium sulfate. To the resulting solution during boiling 50 ml of a solution of barium chloride are added by drops and it is left to stand for an hour. The deposited residue is filtered through a "blue tape" paper filter. The filter is washed with hot water, and then with cold up until a negative reaction to the chlorine ion. After this the filter with the residue is dried, burned on the low flame of a burner, and then calcined in a muffle furnace at a temperature of around 800°C for 10-15 min. After cooling in a desiccator the crucible is weighed with an accuracy to 0.0002 g.

3.8.3. Processing of results.

The content of sulfates recalculated for SO_3 (X_7) in percentages is calculated using the formula:

$$X_7 = \frac{G_1 \cdot 0.3427 \cdot 100}{G}$$

where:

G - weighed portion of pigment, g;

G_1 - mass of barium sulfate found, g;

0.3427 - coefficient of recalculation of BaSO_4 for SO_3 .

Permissible deviations between two parallel determinations - 0.005%.

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3.9. Determination of the content of chlorides recalculated for Cl.

3.9.1. Reagents and solutions used:

nitric acid per GOST 4461--67, chemically pure, 20% solution;

acetic acid per GOST 61--69, 1% solution;

silver nitrate per GOST 1277--63, 1% solution;

distilled water per GOST 6709--53;

filtering type crucible TF POR 10 or POR 16 per GOST 9775--69.

3.9.2. Conducting of the test.

5.00 g of pigment, dried to a constant mass at 105°C, are placed in a 400 ml beaker, 20 ml of a solution of nitric acid are added and it is dissolved with slight heating.

To the resulting solution 100 ml of water are added and it is filtered into a flask through a thick "blue tape" filter. The filter is flushed several times with hot water. The resulting filtrate is cooled and with continuous mixing a solution of silver nitrate is added up to the complete formation of a residue in the form of small clumps. After this the flask with the residue is heated and boiled for 5 min, left for two hours in a dark place, and filtered through a preliminarily weighed filtering crucible.

The residue on the filter is washed with 50 ml of water, acidified with nitric acid (4-5 drops of nitric acid to 50 ml of water), then with 50 ml of a solution of acetic acid up to the complete removal of silver nitrate (test for hydrochloric acid), and then 2-3 times with pure water and dried to a constant mass.

3.9.3. Processing of results.

The content of chlorides recalculated for chlorine (X_8) in percentages is calculated using the formula:

$$X_8 = \frac{G_1 \cdot 0.2474 \cdot 100}{G_1}$$

where:

G - weighed portion of pigment, g;

G_1 - mass of residue, g;

0.2474 - coefficient for recalculation of AgCl for chlorine.
Permissible deviations between two parallel determinations - 0.002%.

3.10. Determination of substances, insoluble in an ammonia solution of ammonium chloride.

3.10.1. Reagents, solutions and equipment used:
ammonium chloride per GOST 3773--60, crystalline;
ammonia water per GOST 3760--64;
distilled water per GOST 6709--53;

reagent - ammonia solution of ammonium chloride, prepared by dissolving 30 g of ammonium chloride and 50 ml of ammonia in 500 ml of water;

filtering crucible type TF POR 10 or POR 16 GOST 9775--69.

3.10.2. Conducting of the test.

500 g of pigment, preliminarily dried to a constant mass at 105°C, are placed in a flask with a ground glass stopper and for one hour at room temperature are agitated with 100 ml of reagent.

After agitation the flask is left at rest for 30 min. After this the solution is decanted through a preliminarily weighed filtering crucible. Another 100 ml of reagent are added to the residue in the flask, it is agitated for 5 min and filtered through the same filter. The residue is transferred from the walls of the flask onto the filter with the help of a glass rod with a rubber tip and a small amount of reagent.

The filter with the residue is flushed several times with water, after which it is dried to a constant mass in a drying chamber at 105°C.

3.10.3. Processing of results.

The content of substances, insoluble in an ammonia solution of ammonium chloride, (X_9) in percentages is calculated using the formula:

$$X_9 = \frac{G_1 \cdot 100}{G},$$

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where:

G - weighed portion of pigment, g;

G_1 - mass of residue, g.

Permissible deviations between two parallel determinations - 0.1%.

3.11. Determination of moisture content.

3.11.1. Conducting of the test.

On the bottom of a weighing bottle (GOST 7148--70) type SNP 3, preliminarily dried to a constant mass, a uniform layer of 5 ± 1 g of pigment is poured.

The weighing bottle is closed with a cover and weighed with an accuracy to 0.0002 g.

The pigment is dried in a drying cabinet at 105°C . During drying the cover of the weighing bottle is open. The weighing bottle is weighed after every hour of drying following cooling in a dessicator. The drying operation is repeated until the difference in the weighing exceeds 0.0004 g.

3.11.2. Processing of results.

The content of moisture (X_{10}) in percentages is calculated using the formula:

$$X_{10} = \frac{(G - G_1) \cdot 100}{G}$$

where:

G - weighed portion of pigment, g;

G_1 - mass of pigment after drying, g.

Permissible deviations between two parallel determinations - 0.01%.

3.12. Determination of oil absorption.

3.12.1. Materials and glassware used:

linseed oil refined per GOST 5791--66;

microburet per GOST 1770--64, capacity 5 ml;

glass rod 8-12 mm in diameter, with a rounded end;

porcelain crucible per GOST 9147--59, No 5.

3.12.2. Testing is conducted according to OST 10086--39, M.I.3.

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A weighed portion equal to 3 g of pigment is taken and the overall time of determination should not exceed 30 min.

3.12.3. Processing of results.

Oil absorption (X_{11}) in grams of oil per 100 g of pigment is calculated using the formula:

$$X_{11} = \frac{V \cdot 100 \cdot \rho}{G}$$

where:

V - volume of oil spent for determination, ml;

ρ - density of oil, g/cm³;

G - weighed portion of pigment, g.

Permissible deviations between two parallel determinations - 2 g/11 g of pigment.

3.13. Covering power is determined in accordance with GOST 8784--58, section IV on a chess board, 10 g of pigment and 5-7 g of natural drying oil (GOST 7931--56) are used.

3.14. Determination of residue on a sieve after wet sifting.

3.14.1. Devices, equipment and materials used:

sieve with screen per GOST 3584--53, No 0063K and No 0045K;

hair brush per GOST 10597--70, from No 18 to No 20;

porcelain evaporating bowl per GOST 9147--59, No 3 or No 4;

watch glass;

crystallizer per GOST 10973--64, No 8.

3.14.2. Conducting of the test.

10.00 g of pigment are placed in the porcelain bowl, it is filled with a small amount of water and then rubbed up with a brush, then another 50 ml of water are added and the resulting suspension decanted onto the sieve which is placed in the crystallizer with water.

Treatment in the bowl is repeated several times until the remaining particles are mashed by a brush and the water becomes clear and colorless. After this the particles are transferred from the bowl with the help of the water onto a sieve and they are flushed with water at the same time that they are being stirred with a brush without pressure.

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The particles are flushed on the sieve until the water which is constantly removed in the crystallizer is transparent and on its bottom there are no traces of pigment.

The residue on the sieve is dried in a drying cabinet at 105°C for an hour. With a dry brush the dried residue is transferred to the watch glass and weighed with an accuracy to 0.0002 g.

3.14.3. Processing of results.

The content of residue on the sieve after wet sifting (X_{12}) in percentages is calculated using the formula:

$$X_{12} = \frac{G_1 \cdot 100}{G},$$

where:

G - weighed portion of pigment, g;

G_1 - residue on sieve, g.

Permissible deviations between two parallel determinations - 0.02%.

3.15. Determination of durability of parkerized primers of brands VL-02 and VL-023 (for zinc tetrahydroxide-chromate brand B).

3.15.1. Equipment and materials used:

ball mill, porcelain or metallic, capacity 250 ml, amount of balls around 350 g;

porcelain beaker per GOST 9147-59, No 2 or No 3;

V3-4 viscosimeter per GOST 9070--59;

polyvinyl butyral per GOST 9439--60, brands LA, LB;

iditol per GOST 2230--43, grade "Extra";

talc per GOST 879--52;

carbon black per GOST 7848--55;

ethyl alcohol technical per GOST 8314--57;

butanol per GOST 5208--50;

acetone per GOST 2768--69;

orthophosphoric acid, technical per GOST 10678--63;

distilled water per GOST 6709--53.

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The base of the primer made from the tested zinc chromate is prepared in a quantity of 150 g according to the formula indicated in Table 2 and rubbed in a ball mill to a degree of wear, based on the "wedge" method, of no more than 30 conditional units.

Table 2

Name of components	Formula of primers, wt %	
	Standards for brands	
	VL-02	Vl-023
Polyvinyl butyral, brand LA	9.5	-
Polyvinyl butyral, brand LB	-	6.0
Iditol	-	6.0
Zinc chromate, brand B	9.1	11.2
Talc	1.6	2.6
Carbon black	-	0.2
Ethyl alcohol	32.0	38.0
Butanol	23.9	18.0
Acetone	23.9	18.0
	100.0	100.0

The acid diluent is prepared according to the formula indicated in Table 3.

Table 3

Name of components	Formula for acid diluent wt %
Orthophosphoric acid recalculated for 100% acid	15.3
Ethyl alcohol recalculated for 100% alcohol	73.2
Distilled water	11.5
	100.0

3.15.3. Conducting of the test.

120-130 g of the primer base, weighed with an accuracy to 0.01 g, are placed in a porcelain beaker and mixed with the acid diluent in the ratios: for the primer of brand VL-02 - 8:1, for the primer of brand VL-023 - 10:1.

The physical-chemical indices of the primer base, the primer, and the acid diluent should conform to the requirements of GOST 12707-67.

In 30 min after mixing of the primer base with the acid diluent the viscosity of the primer is determined with a V3-4 viscosimeter according to GOST 8420--57.

The durability of the primer is determined based on the change in its viscosity in two hours after the mixing.

3.15.4. Processing of results.

The increase in viscosity (X_{13}) in percentages is calculated using the formula:

$$X_{13} = \frac{(\eta_2 - \eta_1) \cdot 100}{\eta_1}$$

where:

- η_1 - viscosity of primer according to the V3-4 viscosimeter in 30 min after mixing of the base with the acid diluent, s;
 η_2 - viscosity of primer according to the V3-4 viscosimeter in 2 hr after mixing of the base with the acid diluent, s.

4. Packing, marking, transportation and storage

4.1. Packing, marking, transportation and storage of zinc chromates are done in accordance with the requirements of GOST 9980-62. Packing is done in rubberized containers or paper sacks with a net weight of no more than 20 kg for zinc tetrahydroxide chromate and 40 kg for zinc chromate and potassium.

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5. Producer's guarantee

5.1. Zinc chromates should be inspected by the technical control of the enterprise-producer. The producer should guarantee the conformity of the zinc chromates to the requirements of these standards with observation by the user of the conditions of use and storage established by the standard.

Guaranteed period of storage of zinc chromates - 12 months from the day of production.

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DISTRIBUTION LIST

DISTRIBUTION DIRECT TO RECIPIENT

<u>ORGANIZATION</u>	<u>MICROFICHE</u>	<u>ORGANIZATION</u>	<u>MICROFICHE</u>
A205 DMATC	1	E053 AF/INAKA	1
A210 DMAAC	2	E017 AF/RDXTR-W	1
B344 DIA/RDS-3C	9	E403 AFSC/INA	1
C043 USAMIA	1	E404 AEDC	1
C509 BALLISTIC RES LABS	1	E408 AFWL	1
C510 AIR MOBILITY R&D	1	E410 ADTC	1
LAB/FIO			
C513 PICATINNY ARSENAL	1	FTD	
C535 AVIATION SYS COMD	1	CCN	1
C591 FSTC	5	ASD/FTD/NIIS	3
C619 MIA REDSTONE	1	NIA/PHS	1
D008 NISC	1	NIIS	2
H300 USAICE (USAREUR)	1		
P005 DOE	1		
P050 CIA/CRB/ADD/SD	2		
NAVORDSTA (50L)	1		
NASA/NST-44	1		
AFIT/LD	1		
ILL/Code L-389	1		
NSA/1213/TDL	2		